

Amendment and Response

Applicant: Jeffrey W. Chambers

Serial No.: 10/064,498

Filing Date: July 22, 2002

Docket No.: C364.104.101

Title: CATHETER WITH FLEXIBLE TIP AND SHAPE RETENTION

IN THE CLAIMS

Please cancel claims 3-9.

Please add claims 40-46.

Please amend claims 16, 17, 25, and 31-33 as follows:

- 1.(Previously Presented) The guide catheter of claim 33, wherein:
the curved shape of the distal tip defines a curvature of ninety degrees or greater; and
the curved distal tip having
a flexibility to permit straightening of the curved distal tip by advancing the
guidewire therethrough; and
shape retention memory to return to the original angle of curvature.
- 2.(Previously Presented) The catheter of claim 1, wherein the distal tip portion is more
flexible than the intermediate section.
3. – 9.(Cancelled)
- 10.(Original) The catheter of claim 1, wherein an amount of curvature of the curved distal tip
can be controlled by a variable stiffness guidewire.
- 11.(Previously Presented) The catheter of claim 1, wherein the distal tip is formed of fused
nylon.
- 12.(Previously Presented) The catheter of claim 1, wherein the distal tip is formed of plastic.
- 13.(Previously Presented) The catheter of claim 1, wherein the distal tip is formed of
polyurethane.

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14.(Previously Presented) The catheter of claim 1, wherein the distal tip includes a wire having shape memory characteristics.

15.(Previously Presented) The catheter of claim 1, wherein the proximal section includes a double braided metal member.

16.(Currently Amended) A catheter generally flexible to conform to vascular areas of a body in combination with a guidewire, the combination comprising:

~~said a~~ catheter extending from a proximal end to a distal end and having an intermediate section therebetween;

a variable stiffness guidewire slidably disposable within a lumen of the catheter, the guidewire having a guidewire proximal end and extending to a guidewire distal end;

the lumen sized to receive the guidewire therein;

the catheter having a curved distal tip characterized by a pre-formed curved portion in its
the distal end (~~curved distal tip~~) of the catheter;

the curved distal tip rotatable to different orientations by rotations of the proximal end of the catheter; and

the curved distal tip having a flexibility to permit straightening of the curved distal tip by sliding the guidewire relative to the catheter.

17.(Currently Amended) ~~The catheter-combination~~ of claim 16, wherein the guidewire has a variable stiffness near the distal end with decreasing stiffness toward a distal tip of the guidewire.

18. – 24.(Cancelled).

25.(Currently Amended) The method of claim 39, wherein:

the catheter generally flexible to conform to vasculature of a body, the catheter extending from a proximal end to a distal end and having an intermediate portion

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therebetween, the catheter having a pre-formed curved portion in the curved distal tip, the curved portion having a flexibility to permit straightening of the curved distal tip by sliding the guidewire relative to the catheter; and

wherein manipulating the catheter to form the curved shape includes:

slidably adjusting the variable stiffness guidewire relative to the catheter and

straightening the pre-formed curved portion; and

withdrawing the guidewire into the catheter allowing the curved distal tip to resume the pre-formed angle of curvature.

26.(Original) The method of claim 25, further comprising the steps of:

rotating the proximal end of the catheter to rotate the distal tip to different orientation,
and

advancing further the guidewire and catheter.

27.(Original) The method of claim 25, further comprising the step of administering medication through the catheter.

28.(Original) The method of claim 25, further comprising the steps of removing the catheter and advancing an angioplasty balloon over the guidewire.

29.(Original) The method of claim 25, further comprising the steps of removing the catheter and advancing a stent over the guidewire.

30.(Original) The method of claim 25, further comprising removing the guidewire.

31.(Currently Amended) A catheter for use in combination with a variable stiffness guidewire, comprising:

a longitudinal axis, a proximal section and a distal section;

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said distal section comprising a soft flexible pre-formed curved portion in its distal end having a curvature of ninety degrees or greater and exhibiting varying flexibility along a length thereof and shape retention properties;

said catheter having

an inner wall that defines a lumen that runs along said longitudinal axis forming a single continuous tube, a reinforcement braid disposed over said inner wall, and

an outside covering disposed over said reinforcement braid;

said catheter proximal end further comprising a spacer disposed between said wall liner and said reinforcement braid; and

said reinforcement braid doubled over the proximately two-thirds of the catheter.

32.(Currently Amended) A catheter for use with a variable stiffness guidewire with a pre-formed curved distal tip, comprising:

~~said a~~ catheter generally flexible to conform to vascular areas of a body,

said catheter extending from a proximal end to a distal end;

said catheter having a lumen therein, the lumen sized to receive a guidewire therein;

the distal tip rotatable to different orientations by rotations of the proximal end of the catheter; and

the distal tip having a pre-determined curvature in a natural state and characterized by a varying flexibility adapted to permit incremental bending of the distal tip by advancing the variable stiffness guidewire therethrough.

33.(Currently Amended) A guide catheter for steering a guidewire from a first body passage to a second, branched body passage having a diameter of not more than 4 mm, the guide catheter comprising:

a catheter body defining a lumen; and

a reinforcement braid extending along the catheter body;

wherein the catheter defines:

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a proximal section,

an intermediate section extending from the proximal section and defining a longitudinal axis,

a distal section extending from the intermediate section and forming a distal tip having an outer diameter sized for deployment within a body passage having a diameter of not more than 4 mm and capable of maintaining a curved shape relative to the longitudinal axis;

and further wherein the distal tip is characterized by a varying flexibility along a length thereof such that in the curved shape, the distal tip is configured to steer a guide wire from a first body passage to a second, branched body passage extending at an angle from the first body passage.

34.(Previously Presented) The guide catheter of claim 1, wherein the catheter is configured to independently maintain the curved shape at the distal tip.

35.(Previously Presented) The guide catheter of claim 33, wherein the catheter is configured such that a spatial orientation of the distal section, in the curved shape, can be altered by rotating the proximal section.

36.(Previously Presented) The guide catheter of claim 33, wherein the lumen at the distal section has a diameter appropriate for steering a guidewire having a diameter of approximately 0.014 inch.

37.(Previously Presented) The guide catheter of claim 33, wherein the lumen at the distal section has a diameter of approximately 0.017 inch.

38.(Previously Presented) The guide catheter of claim 33, wherein an outer diameter of the distal section is approximately 0.029 inch.

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39.(Previously Presented) A method for steering a guide wire within bodily passages of a patient, the method comprising:

- introducing a variable stiffness guidewire into a first body passage;
- targeting a branch body passage having a diameter of not more than 4 mm and extending from the first body passage at an angle;
- deploying a guide catheter over the guidewire such that a distal section of the guide catheter is adjacent the branch passage;
- manipulating the guide catheter such that a distal tip portion of the distal section forms a curved shape;
- further manipulating the guide catheter such that a distal end of the curved distal tip faces the branch body passage;
- distally advancing the guidewire such that the curved distal tip steers the guidewire into the branch body passage; and
- advancing the guide catheter over the guidewire and into the branch body passage.

40.(New) The catheter of claim 32, wherein the distal tip includes a first straight subsection extending from a distal-most end of the catheter and a pre-formed curved subsection extending immediately proximal from the first straight subsection, and further wherein a bending stiffness of the first straight subsection is different from a bending stiffness of the pre-formed curved subsection.

41.(New) The catheter of claim 40, wherein the bending stiffness of the first straight subsection is greater than the bending stiffness of the pre-formed curved subsection.

42.(New) The catheter of claim 40, wherein the distal tip further includes a second straight subsection extending immediately proximal from the pre-formed curved subsection, and further wherein a bending stiffness of the second straight subsection is different from the bending stiffness of the pre-formed curved subsection.

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43.(New) The catheter of claim 42, wherein the bending stiffness of the second straight subsection is greater than the bending stiffness of the pre-formed curved subsection.

44.(New) The catheter of claim 43, wherein the bending stiffness of the first straight subsection is greater than the bending stiffness of the pre-formed curved subsection.

45.(New) The method of claim 39, wherein manipulating the guide catheter such that a distal end of the curved distal tip faces the branch body passage includes:

manipulating the guidewire and the guide catheter relative to one another to change an effective curvature of the distal tip portion until the distal end faces the branch body passage.

46.(New) The method of claim 45, wherein the distal tip portion has a pre-determined curvature in a natural state, and further wherein the effective curvature is between the pre-determined curvature and a straightened state.